

WHAT IS CLAIMED IS:

1. A solid state image device comprising:
an optical lens;
5 a solid state image sensor including a microlens; and
a resin layer formed between said optical lens and
said microlens of said solid state image sensor.

2. The solid state image device according to claim 1,
10 wherein
said optical lens and said microlens of said solid
state image sensor are integrally formed through said
resin layer.

15 3. The solid state image device according to claim 1,
wherein
said microlens of said solid state image sensor has a
refractive index larger than the refractive index of said
resin layer.

20 4. The solid state image device according to claim 1,
wherein
said microlens of said solid state image sensor
includes:
25 a first film having an upwardly projecting shape, and

a second film, formed on said first film, having an upwardly projecting shape reflecting said upwardly projecting shape of said first film.

5 5. The solid state image device according to claim 4, wherein

said first film and said second film are made of materials having the same refractive index.

10 6. The solid state image device according to claim 5, wherein

said first film and said second film are formed by SiN films.

15 7. The solid state image device according to claim 4, wherein

said first film is formed with a plurality of said upwardly projecting shapes at prescribed intervals, and

20 said second film is formed with a plurality of said upwardly projecting shapes to fill up gaps of said first film.

8. The solid state image device according to claim 7, wherein

25 each adjacent pair of said upwardly projecting shapes

of said second film are connected with each other to include no substantially flat region on the boundary therebetween.

5 9. The solid state image device according to claim 7, wherein

the boundary between each adjacent pair of said upwardly projecting shapes of said second film has a thickness of at least 10 nm.

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10. The solid state image device according to claim 1, further comprising a recessed third film formed on said solid state image sensor, wherein

15 said microlens of said solid state image sensor includes a fourth film, embedded in the recessed portion of said third film, exhibiting a larger refractive index than said third film and having a downwardly projecting shape.

20 11. The solid state image device according to claim 10, wherein

said fourth film is formed by an SiN film.

25 12. The solid state image device according to claim 11, wherein

said third film is formed by an SOG film.

13. A method of manufacturing a solid state image device comprising steps of:

5 forming a first film having a prescribed refractive index on a solid state image sensor;

 forming a resist layer on a prescribed region of said first film;

10 performing heat treatment thereby working said resist layer to have an upwardly projecting shape;

 simultaneously etching said resist layer and said first film thereby working said first film to have an upwardly projecting shape reflecting said upwardly projecting shape of said resist layer; and

15 integrally forming said solid state image sensor including said first film having said upwardly projecting shape and an optical lens through a resin layer having a smaller refractive index than said first film.

20 14. The method of manufacturing a solid state image device according to claim 13, further comprising a step of forming a second film exhibiting a refractive index larger than the refractive index of said resin layer and equivalent to or not more than the refractive index of
25 said first film and having an upwardly projecting shape to

fill up a gap between said first film and an adjacent first film in advance of said step of integrally forming said solid state image sensor and said optical lens through said resin layer.

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15. The method of manufacturing a solid state image device according to claim 14, wherein

said step of forming said second film includes a step of connecting said upwardly projecting shape and an adjacent upwardly projecting shape of said second film to include no substantially flat region on the boundary therebetween.

16. The method of manufacturing a solid state image device according to claim 14, wherein

said first film and said second film are made of materials having the same refractive index.

17. The method of manufacturing a solid state image device according to claim 16, wherein

said first film and said second film are formed by SiN films.

18. A method of manufacturing a solid state image device comprising steps of:

forming a columnar part on a prescribed region of a solid state image sensor;

applying a film material to cover said columnar part thereby forming a recessed coating;

5 forming a lens film exhibiting a larger refractive index than said coating and having a downwardly projecting shape to fill up the recessed portion of said coating; and

integrally forming said solid state image sensor including said lens film having said downwardly projecting shape and an optical lens through a resin layer.

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19. The method of manufacturing a solid state image device according to claim 18, wherein

said lens film is formed by an SiN film.

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20. The method of manufacturing a solid state image device according to claim 19, wherein

said coating is formed by an SOG film.

20 21. The method of manufacturing a solid state image device according to claim 18, wherein

the width of an upper portion of said columnar part is smaller than the width of a lower portion.